

Applicants: Velazquez, et al.
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AMENDMENTS TO THE CLAIMS:

This listing of claims replaces the listing of claims in the application.

Listing of Claims:

CLAIMS

What is claimed is:

1. (Currently Amended) Hepatitis A virus recombinant antigens wherein ~~they~~ the antigens are obtained in vegetable cells transformed with genetic constructs which contain chimeric HAV genes based on modified fragments of the HAV genome (SEQ ID NO 3).
2. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 1 characterized by they contain only pentamers.
3. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the claims~~ claim 1 wherein the antigens ~~and 2 characterized by they~~ are obtained from the expression of a chimeric gene according to SEQ ID NO 17 that contains the fusion of the following elements:
 - a. a A nucleotide sequence that codes for the proteins VP2, VP3, VP1 and 2A (SEQ ID NO 25); and
 - b. a A nucleotide sequence that codes for the proteins 3A, 3B, 3C; (SEQ ID NO 13).
4. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 3 wherein the chimeric gene is expressed in vegetable cells regulated by the appropriate promoter and terminator signals.
5. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 4 ~~characterized by they~~ wherein the antigens are obtained in the cytoplasm of the vegetable cell.
6. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 5 ~~characterized by they~~ wherein the antigens are expressed in dicotyledonous plants.

7. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 6 ~~characterized by they~~ wherein the antigens are expressed in tobacco, carrot and fruits of edible plants.
8. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 5 ~~characterized by they~~ wherein the antigens are expressed in monocotyledonous plants.
9. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 8 ~~characterized by they~~ wherein the antigens are expressed in rice and in fruits of edible plants.
10. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 1 ~~characterized by they~~ wherein the antigens contain pentamers and empty capsids.
11. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 10 ~~characterized by they~~ wherein the antigens were obtained from the expression of a chimeric gene that comprises ~~contains~~ the fusion of the two following elements:
 - a. a A nucleotide sequence according to the SEQ ID NO 6 coding for the proteins VP4, VP2, VP3, VP1 and 2A-; and
 - b. a A nucleotide sequence coding for the proteins 3A, 3B and 3C (SEQ ID NO 13) ~~according to the claim 3b~~.
12. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 11 wherein the chimeric gene is expressed in the vegetable cell regulated by appropriate promoter and terminator signals.
13. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 12 ~~characterized by they~~ wherein the antigens are obtained in the cytoplasm of the vegetable cell.
14. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 13 ~~characterized by they~~ wherein the antigens are obtained in dicotyledonous plants.
15. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the~~ claim 14 ~~characterized by they~~ wherein the antigens are expressed in tobacco, carrot and fruits of edible plants.

16. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the claim~~ 13 characterized by they wherein the antigens are obtained in monocotyledonous plants.
17. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the claim~~ 16 characterized by they wherein the antigens are expressed in rice and fruits of edible plants.
18. (Currently Amended) Hepatitis A virus recombinant antigens according to ~~the claim~~ 2 wherein the antigens they are obtained from the coordinated expression of the two chimeric genes:
 - a. a A nucleotide sequence, according to ~~the sequence~~ SEQ ID No.24 coding for the proteins VP2, VP3, VP1, 2A, fused at its 5' end to a signal sequence and at its 3' end to a an spacer sequence followed by the sequence coding for the KDEL peptide-; and
 - b. a A nucleotide sequence according to ~~the sequence~~ SEQ ID No. 23 coding for the proteins 3A, 3B, 3C ~~referred in the claim 3B~~, fused at its 5' end to a signal sequence and at its 3' end to a an spacer sequence followed by the sequence coding for the KDEL peptide.
19. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claim~~ 18 characterized by wherein the chimeric genes are expressed in the vegetable cell regulated by appropriate promoter and terminator signals.
20. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claims~~ claim 18 and 19 wherein the antigens they are obtained in the endoplasmic reticulum of the vegetable cell.
21. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claim~~ 20 characterized by they wherein the antigens are obtained in dycot plants.
22. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claim~~ 21 characterized by they wherein the antigens are obtained in tobacco, carrot and fruits of edible plants.
23. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claim~~ 20 characterized by they wherein the antigens are obtained in monocot plants.

24. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the~~ claim 23 ~~characterized by they~~ wherein the antigens are obtained in rice and fruits of edible plants.
25. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the~~ claim 10 wherein the antigens ~~they~~ are obtained from the coordinated expression of two chimeric genes:-
- a. a A nucleotide sequence according to ~~the sequence~~ SEQ ID No. 22 coding for the proteins VP4, VP2, VP3, VP1, 2A fused at its 5' end to a signal sequence and at its 3' end to a ~~an~~ spacer sequence followed by the sequence coding for the KDEL peptide.
 - b. a A nucleotide sequence according to the SEQ ID NO. 23 coding for the proteins 3A, 3B, 3C, fused at its 5' end to a signal sequence and at its 3' end to a spacer sequence followed by the sequence coding for the KDEL peptide
~~claim 18b.~~
26. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the~~ claim 25 wherein the ~~characterized by~~ chimeric genes are expressed in the vegetable cell regulated by appropriate promoter and terminator signals.
27. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claims~~ claim 25 and 26 ~~characterized by they~~ wherein the antigens are obtained in the endoplasmic reticulum of the vegetable cell.
28. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the~~ claim 27 ~~characterized by they~~ wherein the antigens are obtained in dycot plants.
29. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the~~ claim 28 ~~characterized by they~~ wherein the antigens are obtained in tobacco, carrot and fruits of edible plants.
30. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the~~ claim 27 ~~characterized by they~~ wherein the antigens are obtained in monocot plants.
31. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the~~ claim 30 ~~characterized by they~~ wherein the antigens are obtained in rice and fruits of edible plants.

32. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claims~~ claim 1, ~~3, 11, 18 and 25~~ which can be purified to be administered by parenteral way.
33. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claim~~ claim 32 which can be administered in combination with other viral antigens.
34. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claims~~ claim 1, ~~3, 11, 18 and 25~~ which can be administered by oral way.
35. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claim~~ claim 34 which can be administered as lyophilized extract, pill or capsule.
36. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claims~~ claim 1, ~~3, 11, 18 and 25~~ which can be administered in juice form.
37. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claims~~ claim 1, ~~3, 11, 18 and 25~~ which are immunogenic and rise protective immune response against Hepatitis A.
38. (Currently Amended) Hepatitis A virus recombinant antigens as in ~~the claim~~ claim 32 which can be used as part of a diagnostic kit for Hepatitis A.
39. (Currently Amended) The use of the antigens referred in ~~the claims~~ claim 1 to 38 to prepare simple and combined vaccines.